SM 3H

8.2 Proving Trigonometric Identities 2017-18

Name _____ Date _____ Period _____

Multiply and simplify.

1. $(\sin x+1)(\sin x-1)$

2. $(2\cos x+1)(\cos x-1)$

3. $(\csc x+\sin x)^2$

4. $(2\sin x-1)(2\sin x+1)$

Factor and simplify each expression.

5. $2\sin^2\alpha-5\sin\alpha-3$

6. $\tan^2 x-6\tan x+8$

7. $4\sec^2 x+4\sec x+1$

8. $\tan^2\theta-\sec^2\theta$

Prove each of the following equations is an identity. Show all work! Each step!

9. $\sin(\theta)\cot(\theta) = \cos(\theta)$

10. $1 - \sec(x)\cos^3(x) = \sin^2 x$

11. $\dfrac{\cos\alpha \sin^2\alpha + \cos^3\alpha}{\sin\alpha} = \cot\alpha$

12. $\dfrac{\sin x}{\csc x} + \dfrac{\cos x}{\sec x} = 1$

13. $\tan\alpha\cos\alpha + \csc\alpha\sin^2\alpha = 2\sin\alpha$

14. $(1-\sin^2\theta)(1+\sin^2\theta) = 2\cos^2\theta - \cos^4\theta$

15. $\tan(x)+\cot(x)=\sec(x)\csc(x)$

16. $\dfrac{\sin(x)}{\sin(x)+1}=\dfrac{\csc(x)-1}{\cot^2(x)}$

17. $\dfrac{\csc x+1}{\csc x-1}=\dfrac{1+\sin x}{1-\sin x}$

18. $\csc^2\beta=\cos^2\beta+\cot^2\beta+\sin^2\beta$

Find all real numbers on the interval [0, 2π) that satisfy each equation. Round approximate answers to the nearest tenth.

19. $3\sin^2 x=\sin x$

20. $2\cos^2 x+3\cos x=-1$

21. $5\sin^2 x - 2\sin x = \cos^2 x$

22. $\sin x \cos\left(\frac{\pi}{4}\right) + \cos x \sin\left(\frac{\pi}{4}\right) = \frac{1}{2}$

23. $\sin 2x \cos x - \cos 2x \sin x = -\frac{1}{2}$

24. $\sin\left(\frac{\pi}{6}\right)\cos x + \cos\left(\frac{\pi}{6}\right)\sin x = -\frac{1}{2}$

Find all values of Θ in the interval of [0°, 360°) that satisfy each equation. Round approximate answers to the nearest tenth of a degree.

25. $2\sin\theta = \cos\theta$

26. $3\sin 2\theta = \cos 2\theta$

27. $9\sin^2\theta + 12\sin\theta + 4 = 0$

28. $12\cos^2\theta + \cos\theta - 6 = 0$